

## REMARKS

In the Office Action mailed March 13, 2006, the Examiner took the following action: (1) objected to the drawings; (2) objected to the specification; (3) rejected claims 13 and 26 under 35 USC §112, ¶ 1; (4) rejected claims 1-5, 8, 9, 12, 14-18, 21, 22, 28-33, 35, 36, and 43-47 under 35 USC §102(b) as being anticipated by Kim (US 5,403,133); (5) rejected claims 1-5, 8, 9, 11-18, 21, 22, 24-33, 35-37, and 43-47 under 35 USC §102(e) as being anticipated by Boyd-Davis (US 6,843,328); (6) rejected claims 7 and 20 under 35 USC §103(a) as being unpatentable over Boyd-Davis; and (6) rejected claims 7 and 20 under 35 USC §103(a) as being unpatentable over Kim. The Examiner acknowledged, however, that claims 38-42 are allowable. Applicants respectfully request reconsideration of the application in view of the foregoing amendments and the following remarks.

### *I. Objections to the Drawings*

The Examiner objected to the drawings as failing to show a specific embodiment as recited in claims 13 and 26, namely, an apparatus including a plurality of vacuum attachment devices in combination with the other limitations recited in these claims. Without prejudice or comment as to the merits of the Examiner's objections, Applicants have amended claims 13 and 26 to remove the limitation referencing the plurality of vacuum attachment devices. Accordingly, Applicants respectfully request reconsideration and withdrawal of the objection to the drawings.

### *II. Objections to the Specification*

The Examiner objected to the specification due to an informality on page 14, line 28. Applicants have amended the specification to correct the informality noted by the Examiner, and respectfully request reconsideration and withdrawal of the objection to the specification.

### *III. Rejections under 35 U.S.C. §112, ¶ 1*

Claims 13 and 26 have been rejected under 35 USC §112, ¶ 1 as failing to comply with the enablement requirement. Specifically, the Examiner rejected claims 13 and 26 on grounds that an apparatus including a plurality of vacuum attachment devices in combination with the other limitations recited in these claims lacks enablement. Without prejudice or comment as to the merits of the Examiner's rejections, Applicants have amended claims 13 and 26 to remove the limitation referencing the plurality of vacuum attachment devices. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections of claims 13 and 26 under 35 USC §112, ¶ 1.

### *IV. Rejections under 35 U.S.C. 103(a) based on Boyl-Davis*

Claims 7 and 20 stand rejected under 35 USC §103(a) as being unpatentable over Boyl-Davis (US 6,843,328). Applicants respectfully note that the provisions of 35 U.S.C. § 103(c) of the American Inventors Protection Act regarding subject matter that qualifies as anticipatory art under 35 U.S.C. § 102(e) apply to Boyl-Davis. Accordingly, Boyl-Davis may not be used to preclude the patentability of the pending claims under 35 U.S.C. § 103(a), and the rejections of claims 7 and 20 under 35 U.S.C. § 103(a) must be withdrawn.

Applicants submit that Boyl-Davis qualifies as anticipatory art only under 35 U.S.C. § 102(e) because (A) Boyl-Davis is a U.S. Patent with a filing date (Dec. 10, 2001) earlier than the effective filing date of the subject application (June 25, 2003), with a publication date (June 26, 2003) that is not more than one year prior to the effective filing date of the subject application, (B); the inventive entity of the subject application (Buttrick *et al.*) is different than that of the cited reference (Boyl-Davis *et al.*); and (C) 35 U.S.C. § 102(a) does not apply because

Boyl-Davis does not have a publication date (June 26, 2003) earlier in time than the effective filing date of the subject application (June 25, 2003). See MPEP § 706.02(a).

Furthermore, Boyl-Davis is assigned to The Boeing Company. Applicants respectfully submit that, at the time the subject matter of the present application was made, it was owned by, or subject to an obligation of assignment to, the same entity, namely The Boeing Company, as evidenced by the assignment filed herein and recorded at Reel 014238 and Frame 0397.

Under the American Inventor's Protection Act, 35 U.S.C. § 103(c) as amended provides that art "which qualifies as prior art under one or more of subsections (e) (f) and (g) of section 102 shall not preclude patentability under this section ...where the subject matter was at the time the invention was made, was owned by the same person or subject to an obligation of assignment to the same person." See MPEP § 706.02(l)(1). Because 35 U.S.C. § 103(c) applies, Boyl-Davis may not be used to preclude the patentability of pending claims 7 and 20.

Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections of pending claims 7 and 20 under 35 USC § 103(a) as being unpatentable over Boyl-Davis.

*V. Rejections under 35 U.S.C. 102(a) and 103(a) based on Kim,  
and rejections under 35 U.S.C. 102(e) based on Boyl-Davis*

Claims 1-5, 8, 9, 12, 14-18, 21, 22, 28-33, 35, 36, and 43-47 stand rejected under 35 USC §102(b) as being anticipated by Kim (US 5,403,133), and claims 7 and 20 have been rejected under 35 USC §103(a) as being unpatentable over Kim. Also, claims 1-5, 8, 9, 11-18, 21, 22, 24-33, 35-37, and 43-47 have been rejected under 35 USC §102(e) as being anticipated by Boyl-Davis (US 6,843,328).

Claims 1-5, 7-9 and 13

As amended, claim 1 recites:

1. An apparatus for supporting a tool relative to a surface of a workpiece, the apparatus comprising:

a base;

a tool support coupled to the base and moveable along a translation axis relative to the base, the tool support being configured to be coupled to the tool, at least one of the base and the tool support being further configured to operatively position the tool relative to the workpiece for performing the manufacturing operation on the workpiece; and

*a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support. (emphasis added).*

Kim (US 5,403,133)

Kim teaches an automated welding and milling apparatus. According to Kim, a carriage 22 is coupled to a rail 4 that is suspended over a workpiece A, A', and either a welder 8 or a cutter 26 are mounted on the carriage 22. (2:39-45; 5:55-56). According to Kim, the cutter 26 is configured to form "rear side welding grooves" in the workpiece(s) A, A'. (5:60-61). As shown in Figures 10a, 10b, and 11, a pneumatic cylinder 27 is mounted on the carriage 22. (5:55-58). Kim specifies that "In order to adjust the distance between the level of the rail and the grooves ... a primary adjustment is carried out by the pneumatic cylinder 27[.]" (6:1-5).

Kim does not disclose, teach, or fairly suggest the apparatus recited in claim 1. Specifically, Kim does not teach or suggest an apparatus that includes a base, a tool support, and *a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support* as recited in claim 1. According to Kim, the pneumatic cylinder

27 simply adjusts the distance between the rail 4 and the grooves formed by the cutter 26. (6:1-5). There is no teaching or suggestion in Kim of *a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support* as recited in claim 1. Therefore, claim 1 is allowable over Kim.

There is also no teaching or suggestion in Kim of *a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support* as further recited in claim 1. More specifically, the Examiner cites components 34, 35, 36 of Kim as being a tool support. With reference to Kim's Figure 11, Kim teaches that a nylon guide roller 34 mounted on a shaft 32 and having a bearing 33 and a stopper 35. According to Kim, the guide roller 34 helps to prevent deviations in the depth of the grooves due to deviations in the surface of the workpieces A, A'. (6:8-21). A rotatably handle 30 enables an operator to perform a secondary adjustment of the distance between the rail 4 and the grooves. (6:1-7). Thus, according to Kim, the pneumatic cylinder 27 is not coupled to the guide roller 34, bearing 33, and stopper 35, as these components 33, 34, 35 are controlled by the handle 30. For this additional reason, claim 1 is allowable over Kim.

Boyl-Davis (US 6,843,328)

Boyl-Davis does not remedy the above-noted deficiencies of Kim. Boyl-Davis teaches an X-axis carriage 30 moveably mounted on rails 22, 24, and a Y-axis carriage 50 mounted on the X-axis carriage 30. (5:5-6; 6:9-10). A drill assembly 80 is coupled to the Y-axis carriage 50 by a clamp ring assembly 70. (6:25-27). The clamp ring assembly 70 is moveable along X and Y axes by the carriages 30, 50, respectively.

Boyl-Davis does not disclose, teach, or fairly suggest the apparatus recited in claim 1. Specifically, Boyl-Davis does not teach or suggest an apparatus that includes a base, a tool

support, and a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support as recited in claim 1. The components of *Boyl-Davis* cited by the Examiner as constituting a biasing device (i.e. 40, 60, 70, 92, 94, 96, 100) cooperatively effectuate movement of the drilling assembly 80, however, there is no teaching or suggestion in *Boyl-Davis* of a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support as recited in claim 1. Therefore, claim 1 is allowable over *Boyl-Davis*.

There is also no teaching or suggestion in *Boyl-Davis* of a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support as further recited in claim 1. More specifically, the tool support of *Boyl-Davis* (i.e. the clamp ring assembly 70) is rigidly coupled to the Y-axis carriage 50. There is no biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support as recited in claim 1. For this additional reason, claim 1 is allowable over *Boyl-Davis*.

Claims 2-5, 7-9 and 13 depend from claim 1 and are allowable at least due to their dependencies on claim 1, and also due to additional limitations recited in these claims. For example, claim 2 recites the apparatus of Claim 1, wherein the biasing device is further configured to adjustably apply the biasing force, the apparatus further comprising a control mechanism coupled to the biasing device, *the control mechanism being configured to adjustably control a magnitude of the biasing force.* (emphasis added). Similarly, claim 5 recites the apparatus of Claim 1, wherein the biasing device includes a pneumatic actuator, further comprising a control valve coupled to the pneumatic actuator, *the control valve being configured*

to adjustably control at least one of a magnitude and a direction of a biasing force applied to the tool support by adjustably controlling a pressure within the pneumatic actuator. (emphasis added). Claim 9 recites the apparatus of Claim 1, wherein the biasing device is controllably biasable in a biasing direction along a biasing axis. These additional limitations are also not disclosed, taught, or fairly suggested by the Kim and Boyl-Davis.

#### Claims 12 and 11

Claim 12 recites:

12. An apparatus for supporting a tool relative to a surface of a workpiece, the apparatus comprising:

a base configured to be attached to the workpiece, wherein the base includes:

at least one elongated rail member;

a plurality of vacuum attachment devices connected to the at least one rail member and configured to be coupleable to the surface of the workpiece; and

a carriage assembly moveably coupled to the at least one rail member, wherein the carriage assembly includes a drive assembly having a drive motor operatively engaging the at least one rail member and configured to drive the carriage assembly along the at least one rail member along a movement axis;

a tool support coupled to the carriage assembly and moveable along a translation axis relative to the carriage assembly, the tool support being configured to be coupled to the tool; and

a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support. (emphasis added).

As described more fully above, the Cited References (Kim and Boyl-Davis) do not disclose, teach, or fairly suggest the assembly recited in claim 12. Specifically, the Cited References do not teach or suggest an assembly that includes a base, a tool support, and a

*biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support as recited in claim 12. According to Kim, the pneumatic cylinder 27 simply adjusts the distance between the rail 4 and the grooves formed by the cutter 26. (6:1-5). The components of Boyd-Davis cited by the Examiner as constituting a biasing device (i.e. 40, 60, 70, 92, 94, 96, 100) serve only to effectuate movement of the drilling assembly 80. There is no teaching or suggestion in the Cited References of a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support as recited in claim 12.*

Similarly, there is no teaching or suggestion in the Cited References of *a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support as further recited in claim 12.* The pneumatic cylinder 27 of Kim is not coupled to the guide roller 34, bearing 33, and stopper 35, and the clamp ring assembly 70 of Boyd-Davis is rigidly coupled to the Y-axis carriage 50. For this additional reason, claim 12 is allowable over the Cited References.

In addition, claim 12 is further allowable over Kim for the additional reason that claim 12 recites *a plurality of vacuum attachment devices connected to the at least one rail member and configured to be coupleable to the surface of the workpiece.* There is no teaching or suggestion in Kim of this additional limitation.

For these reasons, claim 12 is allowable over the Cited References. Claim 11 depends from claim 12 and is allowable over the Cited References at least due to its dependency on claim 12, and also due to additional limitations recited in this claim.



Claims 14-22 and 26-27

Claim 14 recites:

14. An assembly for performing a manufacturing operation on a surface of a workpiece, the assembly comprising:

a base;

a tool support moveably coupled to the base and moveable along a translation axis relative to the base, at least one of the base and the tool support being configured to operatively position the tool relative to the workpiece for performing the manufacturing operation on the workpiece;

a manufacturing tool coupled to the tool support and configured to be engageable with the surface of the workpiece to perform the manufacturing operation on the surface of the workpiece; and

*a biasing device having a first portion coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the manufacturing tool.* (emphasis added).

As described more fully above, the Cited References do not disclose, teach, or fairly suggest the assembly recited in claim 14. Specifically, the Cited References do not teach or suggest an assembly that includes a base, a tool support, and *a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support* as recited in claim 14. Similarly, there is no teaching or suggestion in the Cited References of *a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support* as further recited in claim 14. For these reasons, claim 14 is allowable over the Cited References.

Claim 15-22 and 26-27 depend from claim 14 and are allowable over the Cited References at least due to their dependencies on claim 14, and also due to additional limitations recited in these claims. For example, claim 15 recites the assembly of Claim 14, wherein the *biasing device is further configured to adjustably apply the biasing force, the assembly further*

*comprising a control mechanism coupled to the biasing device, the control mechanism being configured to adjustably control a magnitude of the biasing force, and claim 16 recites the apparatus of Claim 15, wherein the control mechanism is further configured to control a direction of the biasing force.* (emphasis added). Similarly, claim 17 recites the apparatus of Claim 18, further comprising *a control valve coupled to the pneumatic actuator, the control valve being configured to adjustably control at least one of a magnitude and a direction of a biasing force applied to the tool support by adjustably controlling a pressure within the pneumatic actuator.* (emphasis added). These additional limitations are also not disclosed, taught, or fairly suggested by the Cited References.

#### Claims 25 and 24

As amended, claim 25 recites:

25. An assembly for performing a manufacturing operation on a surface of a workpiece, the assembly comprising:

a base configured to be attached to the workpiece, wherein the base includes:

at least one elongated rail member;  
a plurality of vacuum attachment devices connected to the at least one rail member and configured to be coupleable to the surface of the workpiece; and

a carriage assembly moveably coupled to the at least one rail member, wherein the carriage assembly includes a drive assembly having a drive motor operatively engaging the at least one rail member and configured to drive the carriage assembly along the at least one rail member;  
a tool support coupled to the carriage assembly and moveable along a translation axis relative to the carriage assembly;

a manufacturing tool coupled to the tool support and configured to be engageable with the surface of the workpiece to perform the manufacturing operation on the surface of the workpiece; and

*a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the manufacturing tool.* (emphasis added).

Again, for the reasons described more fully above, the Cited References do not disclose, teach, or fairly suggest the assembly recited in claim 25. Specifically, the Cited References do not teach or suggest an assembly that includes a base, a tool support, and *a biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support* as recited in claim 25. There is also no teaching or suggestion in the Cited References of *a biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support* as further recited in claim 25. For these reasons, claim 25 is allowable over the Cited References. Claim 24 depends from claim 25 and is allowable over the Cited References at least due to its dependency on claim 25, and also due to additional limitations recited in this claim.

#### Claims 28-33 and 35-37

As amended, claim 28 recites:

28. A method of performing a manufacturing operation on a surface of a workpiece, the method comprising:  
moveably supporting a manufacturing tool relative to the surface of the workpiece using a tool support moveably coupled to a base, the manufacturing tool being moveable along a translation direction; and  
*applying a biasing force to the tool support using a biasing device having a first portion coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply the biasing force to at least partially counterbalance a force applied to the tool support by a weight of the manufacturing tool.* (emphasis added).

As described more fully above, the Cited References do not disclose, teach, or fairly suggest the method recited in claim 28. Specifically, the Cited References do not teach or suggest a method that includes *applying a biasing force to the tool support using a biasing*

device having a first portion coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply the biasing force to at least partially counterbalance a force applied to the tool support by a weight of the manufacturing tool as recited in claim 28. For these reasons, claim 28 is allowable over the Cited References.

Claim 29-33 and 35-37 depend from claim 28 and are allowable over the Cited References at least due to their dependencies on claim 28, and also due to additional limitations recited in these claims. For example, claim 30 recites the method of Claim 28, wherein *applying a biasing force includes adjustably applying a biasing force using a biasing device configured to adjustably apply the biasing force.* (emphasis added). Similarly, claim 31 recites the method of Claim 30, wherein *adjustably applying a biasing force includes adjustably applying at least one of a magnitude and a direction of the biasing force.* (emphasis added). Claim 32 recites the method of Claim 33, wherein applying a biasing force using a biasing cylinder includes *adjustably applying a biasing force using a control device coupled to the biasing cylinder and configured to adjustably control at least one of a magnitude and a direction of the biasing force.* (emphasis added). These additional limitations are also not disclosed, taught, or fairly suggested by the Cited References.

#### Claims 43-45

As amended, claim 43 recites:

43. An apparatus for supporting a tool relative to a surface of a workpiece, the apparatus comprising:

a base;

a tool support coupled to the base and moveable along a translation axis relative to the base, the tool support being configured to be coupled to the tool, at least one of the base and the tool support being configured to operatively position the tool relative to the workpiece for performing the manufacturing operation on the workpiece; and

*a biasing device including a pressurizable cylinder having a first portion coupled to the tool support and a second portion coupled to the base, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support. (emphasis added).*

As described more fully above, the Cited References do not disclose, teach, or fairly suggest the apparatus recited in claim 43. Specifically, the Cited References do not teach or suggest an assembly that includes a base, a tool support, and a *biasing device ... configured to apply a biasing force to the tool support to at least partially counterbalance a force exerted on the tool support along the translation axis by a weight of the tool coupled to the tool support* as recited in claim 43. There is also no teaching or suggestion in the Cited References of a *biasing device having a first portion operatively coupled to the base and a second portion coupled to the tool support, the first and second portions being moveably coupled and configured to apply a biasing force to the tool support* as further recited in claim 43. For these reasons, claim 43 is allowable over the Cited References. Claims 44 and 45 depend from claim 43 and are allowable over the Cited References at least due to their dependencies on claim 43, and also due to additional limitations recited in these claims.

#### Claims 46-47

As amended, claim 46 recites:

46. A method of performing a manufacturing operation on a surface of a workpiece, the method comprising:

moveably supporting a manufacturing tool relative to the surface of the workpiece using a tool support moveably coupled to a base, the manufacturing tool being coupled to a tool support, the tool support moveable along a translation direction; and

*applying a biasing force to the tool support using a pressurizable cylinder having a first portion coupled to the tool support and a second portion coupled to the base, the first and second portions being moveably coupled and configured to apply the biasing force to at least partially counterbalance a force applied to the tool support by a weight of the manufacturing tool. (emphasis added).*

As described more fully above, the Cited References do not disclose, teach, or fairly suggest the method recited in claim 46. Specifically, the Cited References do not teach or suggest a method that includes *applying a biasing force to the tool support using a pressurizable cylinder having a first portion coupled to the tool support and a second portion coupled to the base, the first and second portions being moveably coupled and configured to apply the biasing force to at least partially counterbalance a force applied to the tool support by a weight of the manufacturing tool* as recited in claim 46. For these reasons, claim 46 is allowable over the Cited References. Claim 47 depends from claim 46 and is allowable over the Cited References at least due to its dependency on claim 46, and also due to additional limitations recited in these claims.

#### CONCLUSION

For the foregoing reasons, Applicants respectfully submit that claims 1-5, 7-9, 11-18, 20-22, 24-33, and 35-47 are now in condition for allowance. If there are any remaining matters that may be handled by telephone conference, the Examiner is kindly invited to contact the undersigned attorney at the telephone number listed below.

Respectfully Submitted,

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By: \_\_\_\_\_

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